Linking research to practice: the rise of evidence-based health sciences librarianship*

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Purpose: The lecture explores the origins of evidence-based practice (EBP) in health sciences librarianship beginning with examples from the work of Janet Doe and past Doe lecturers. Additional sources of evidence are used to document the rise of research and EBP as integral components of our professional work.

Methods: Four sources of evidence are used to examine the rise of EBP: (1) a publication by Doe and research-related content in past Doe lectures, (2) research-related word usage in articles in the *Bulletin of the Medical Library Association* and *Journal of the Medical Library Association* between 1961 and 2010, (3) Medical Library Association activities, and (4) EBP as an international movement.

Results: These sources of evidence confirm the rise of EBP in health sciences librarianship. International initiatives sparked the rise of evidence-based librarianship and continue to characterize the movement. This review shows the emergence of a unique form of EBP that, although inspired by evidence-based medicine (EBM), has developed its own view of evidence and its application in library and information practice.

Implications: Health sciences librarians have played a key role in initiating, nurturing, and spreading EBP in other branches of our profession. Our close association with EBM set the stage for developing our own EBP. While we relied on EBM as a model for our early efforts, we can observe the continuing evolution of our own unique approach to using, creating, and applying evidence from a variety of sources to improve the quality of health information services.

BACKGROUND

When I was first told that I had been selected as the Janet Doe Lecture for 2013, my reaction can best be described as a mixture of total panic and excitement. The panic was exacerbated when I began to read earlier Doe lectures, a practice that has become a ritual for the Doe lecturer-elect. I was able to revisit many of the Doe lectures that inspired my own career over the years and to read others that were less familiar to me. All contained useful insights as well as many visionary ideas. I was impressed by the ''aerial view'' that so many of the Doe lecturers brought to their topics. The ability to see the view from the top was clearly based on their years of involvement in the field and the kind of wisdom that can only come from having been there.

The excitement started to set in when I realized that One Health was a joint meeting of the 2013 Annual Meeting and Exhibition of the Medical Library Association (MLA '13), the 11th International Congress on Medical Librarianship (ICML), the 7th International Conference of Animal Health Information Specialists (ICAHIS), and the 6th International Clinical Librarian Conference (ICLC). As a British, Canadian, and, now, US citizen, I was reminded of how excited I had been when the world of medical librarianship opened to me in 1970, when I was hired as a librarian at the McMaster University Health Sciences Center. I had the good fortune to have as library director, Beatrix Robinow, who had been an MLA Cunningham Fellow from South Africa. She had subsequently moved to Canada and was the founding librarian at the new medical school at McMaster. Mrs. Robinow, as we always called her, was devoted to the Medical Library Association (MLA), serving on the Board of Directors from 1978 to 1981 and making sure that her fledging librarians were able to attend MLA meetings. I learned so much from Mrs. Robinow and MLA over the years, taking as many continuing education courses as I could and eventually teaching some myself. This personal history made the idea of presenting a Doe lecture at an international meeting especially exciting.

As I reflected on the aspects of the field that I had become passionate about, the idea of linking research to practice kept resurfacing: it seemed to sum up much of what I have been trying to do over the years. The advent of evidence-based library and information practice (EBLIP) and the leadership role that health sciences librarians were playing in its development seemed to be the perfect way to illustrate the practical value of linking research to practice. What a relief—at least I had a topic!

At that point, I thought I should learn more about the history of the Janet Doe Lecture and Janet Doe herself, so that I could get some ideas on how to take my topic and turn it into a respectable lecture. To my delight, I came across an article by Janet Doe in the *Bulletin of the Medical Library Association (BMLA)*, ''The Survey and After'' [1]. Although published in 1961, the article reported on a ''survey'' of the ailing Army Medical Library that was conducted in 1943 by a committee that included three medical librarians: Janet

* The Janet Doe Lecture on the history or philosophy of medical librarianship, presented at MLA '13, the 113th Annual Meeting of the Medical Library Association; Boston, MA; May 6, 2013; Mark E. Funk, AHIP, FMLA, the 2012 Janet Doe Lecturer, gave the introduction.

Doe, Mary Louise Marshall, and Thomas P. Fleming. In what researchers today would be more likely to call a detailed case study, the committee members conducted a careful and thorough investigation of the state of the Army Medical Library. Their research methods included interviews, documentary evidence, and in-depth observation of the library site, its collections, and its services. Despite its reputation as ''the greatest collection of medical literature in existence,'' stated Doe, the library and its collection were in dire straits after the Great Depression, housed in dilapidated quarters, with a drastically diminished budget and staff. She went on to describe the results of their study and its effect on the rebuilding of the library services and collections over the ensuing sixteen years, culminating in the transfer of stewardship of the library to the new National Library of Medicine building in 1956. I was left to wonder if there had ever been a better example of how research can lead to profoundly consequential outcomes for our field.

THE RISE OF EVIDENCE-BASED MEDICINE

Next, I turned my attention to the rise of evidence-based medicine, since medicine was the first health discipline to adopt the evidence-based practice model. I experienced some of this early history firsthand when I was hired as a medical librarian at McMaster in 1970. The medical school was brand new, and among the faculty recruits was Dr. David Sackett, who came to head the Department of Clinical Epidemiology and Biostatistics. At McMaster, it was not going to be business as usual, and Dr. Sackett fit right in. He wanted to create a different kind of department that would link research to clinical practice. None of us in the library were quite sure how this would work, but Dr. Sackett's enthusiasm was contagious, and soon we were trying to find ways of supporting the department.

We developed a clinical librarian program to respond to information needs in the 450-bed hospital that was part of the academic health sciences center. This was where I caught my first glimpse of the impact of linking research to practice. One morning when I went to rounds, I saw the residents poring over a paper copy of an article I had put up on the bulletin board in the conference room, and I realized that they were going to change the care of a patient based on the results of the study reported in the article. I was hooked! Eventually, thanks to the advice and mentorship of Dr. Sackett and his colleagues, I was able to conduct a randomized controlled trial to evaluate the educational impact of our clinical librarian service [2].

Medical education at McMaster was problem based, which meant that students had to research a hypothetical patient case and apply what they had learned to solving the patient's clinical problems. Eventually, this process was applied to actual patient care. Lectures were replaced by tutorials and problem-solving groups. The library and its resources were very much at the heart of the clinical problem solving activity. In retrospect, Dr. Sackett and his colleagues at McMaster medical school were sowing the seeds of what later became known as evidence-based medicine, although that was not the original terminology that was used.

In 1981, the Department of Epidemiology and Biostatistics began producing a series of articles in the *Canadian Medical Association Journal* on how to read clinical journals [3]. At McMaster, tutorials were organized on this topic with the title, ''Critical Appraisal of the Literature.'' The librarians were involved along with faculty as mentors in the critical appraisal tutorials, and medical students were taught how to find evidence in the medical literature and apply it to patient care. A similar series of articles on critical appraisal, called ''Users' Guides to the Medical Literature,'' began in the *Journal of the American Medical Association (JAMA)* in 1993 [4]. Dr. Sackett and his colleagues went on to publish a book on clinical epidemiology in 1985 that elaborated on his vision for linking research to practice [5].

In a 1996 article in the *British Medical Journal*, Sackett and his colleagues provided what had become the standard definition of evidence-based medicine: ''The conscientious and judicious use of current best practice in making decisions about the care of individual patients'' [6]. The evidence-based model consists of a combination of best research evidence from the research literature combined with clinical expertise and patient values and preferences. Integrated into this evidence-based model was a hierarchy of levels of evidence starting with expert opinion, followed by case report, case control studies, cohort studies, randomized controlled trials (RCTs), and systematic reviews. Each successive level in the hierarchy was considered to be a stronger form of evidence.

Evidence-based medicine has since spread worldwide, thanks to organizations such as the international Cochrane Collaboration that bring together the best evidence from the medical literature. In the United States, the Agency for Healthcare Research and Quality (AHRQ) has funded the creation of systematic reviews and developed a repository for them. Over the years, evidence-based practice as a concept has spread to the other health professions as well as to fields outside of the health sciences, such as social work, education, and management.

Of course, there is more to the early development of evidence-based medicine than I have been able to describe in this lecture; however, I hope that this glimpse into its early development at McMaster and the important role played by librarians provides some useful insights.

SOURCES OF EVIDENCE FOR THE RISE OF EVIDENCE-BASED HEALTH SCIENCES LIBRARIANSHIP

1. The Janet Doe Lectures

While it has taken some time for the concept of evidence-based practice to take hold in librarianship,

we can see the seeds for this development not only in the work of Janet Doe, but also in the content of earlier Doe lectures. In 1977, Erich Meyerhoff, AHIP, FMLA, noted a shift from historical to scientific inquiry in the profession and cited the pool of talent represented by hospital librarians and the rise of the women's movement as instrumental factors in the change [7]. In her 1985 lecture, Lucretia W. McClure, AHIP, FMLA, discussed ''The Promise of Fruit…and Light,'' nothing the possibility of changing our designation as librarians from ''Keeper of the Printed Book'' to ''Keeper of Knowledge'' [8]. McClure also cited Estelle Brodman's article on citation patterns in physiology journals published in 1944, in which the author used her own research experience to create a critical appraisal of citation analysis as a research method [9]. Another early evidence-based practitioner!

In 1986, Doe lecturer Virginia H. Holtz, AHIP, FMLA, noted an enduring concern in the profession with ''measures of excellence'' including standards, library statistics, and other forms of data used to monitor and improve library services [10]. In 1987, Erika Love, FMLA, chair of the original MLA Research Committee, made direct reference to the importance of research to the profession in her address, ''The Science of Librarianship: Investing in the Future'' [11]. In 1989, Rachael K. Anderson, AHIP, FMLA, went on to cite ''research competence' as one of the six key attributes required by librarians in their evolving roles [12]. She described roles both in assisting library users to do their research and conducting library research that will inform the development of library services. In her 1994 lecture, ''The Idea of the Library,'' Nina W. Matheson, AHIP, FMLA, declared that ''organizations will flourish who are able to apply knowledge to create knowledge and to organize it to produce knowledge'' [13]. In 1998, Wayne J. Peay, FMLA, revisited the need for better data to inform library practice in his paper, ''Strategies and Measures for the Next Century'' [14].

The discussion of evidence-based practice has continued in some of the more recent Doe presentations as well. In 1999, Sherrilynne Fuller, FMLA, was very direct in her reference to research when she spoke of ''Enabling, Empowering, Inspiring: Research and Mentorship throughout the Years'' [15]. In 2005, Fred W. Roper, AHIP, FMLA, gave a history of the MLA continuing education program that reminded us of the importance of this program in our professional development, including the development of our research competencies [16]. In 2011, T. Scott Plutchak, AHIP, FMLA, used his experience as editor of the *Journal of the Medical Library Association (JMLA)* and in scholarly publishing to speculate on the ''Dawning of the Great Age of Librarians'' [17]. Plutchak noted that there is much work to be done by librarians in making the products of research accessible and usable to our library users and to ourselves. Despite the increasing abundance of research and scholarship, linking research to practice continues to be a challenge. Mark E. Funk, AHIP, FMLA, provided an illuminating look into our own changing world of practice through his textual analysis of articles published in the *BMLA* and *JMLA* from 1961 to 2010 [18]. I will leave further discussion of Funk's findings to the next section of this lecture.

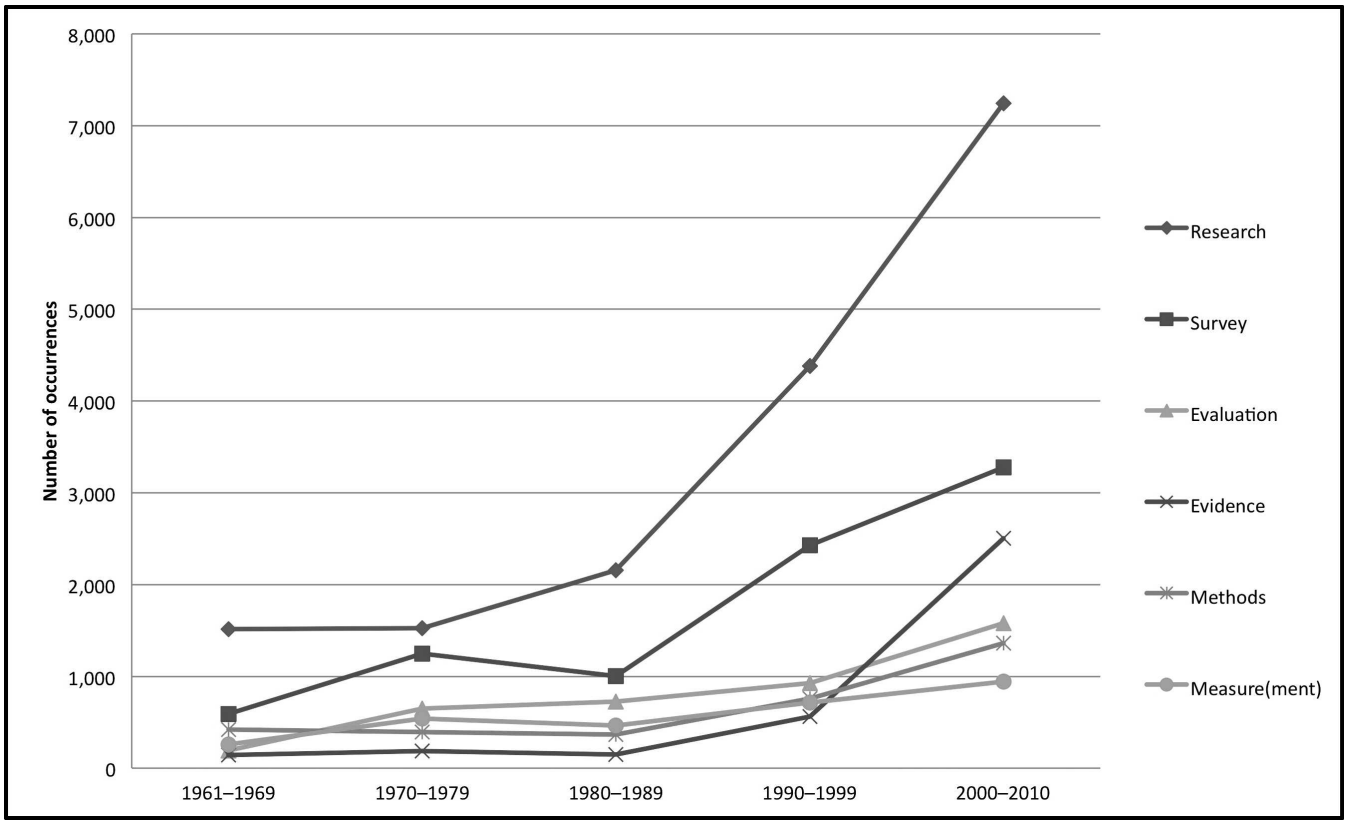
2. Our own words

Fortunately for me, 2012 Doe Lecturer Funk created the perfect opportunity to study the rise of evidence-based practice in health sciences librarianship [18]. Funk's amazing feat of downloading articles published in the *BMLA* and *JMLA* between 1961 and 2010 resulted in an electronic corpus of 84,648 unique words that allowed him to track the frequency of word usage over time. His analysis revealed changes in 4 major areas: the environments in which we exist both inside and outside the library; our approaches to library and information management; the growing importance of technology, including digitization and the Internet; and an increasing interest and involvement in research. Using this dataset, I was able to delve more deeply into the use of research and evidence-based practice word usage. With the help of my research assistants, we identified 6 broad research terms in the dataset and the term variants related to them. The terms were as follows: ''research'' with 88 term variants, ''survey'' with 32 term variants, ''evaluation'' with 18 term variants, ''methods'' with 6 term variants, ''evidence'' with 19 term variants, and ''measurement'' with 13 term variants. A variant was defined as a different form of the word such as research, researcher, research-based, and so on. Between 1961 and 2010, there were 39,211 uses of all the research-related terms or their variants.

While word usage increased for all of the term groupings, the terms research and evidence and their variants show the most rapid rise, especially since 1990. Figure 1 provides a visual picture of the rise in each decade as well as the relative frequency of term use. The popularity of the survey as a form of data collection is evident, as is the focus on evaluation as a type of research. A similar decade-by-decade analysis of word use as a percent of all words in the database showed a similar trend.

Funk made effective use of sparklines, which are helpful for visualizing patterns in time series data such as the *BMLA/JMLA* corpus. The reader is referred to Funk's article for a discussion of the origin and use of this method for displaying data [18]. Using Funk's approach, the following sparklines show the actual rise and fall of word usage each year as well as a superimposed trend line, based on the data over time. Sparklines were developed for each of the six broad research terms. In Figure 2, the continuous rise in use of the term research and its variants is evident. In Figure 3, there is a steady but still rising curve for the term evaluation and its variants. The use of methods terms shown in Figure 4 also shows a consistent rise. In Figure 5, the use of the term evidence and its variants was low and flat from the 1960s through the mid-1990s, but then it started to rise

Figure 1
Number of term uses by decade*



* Total occurrences of all terms and variants between 1961 and 2010=39,211.

quickly. The two remaining sparklines for the terms survey and measure(ment) (Figures 6 and 7) show the continuing popularity of the survey method for collecting data but more modest gains for terms related to measure(ment).

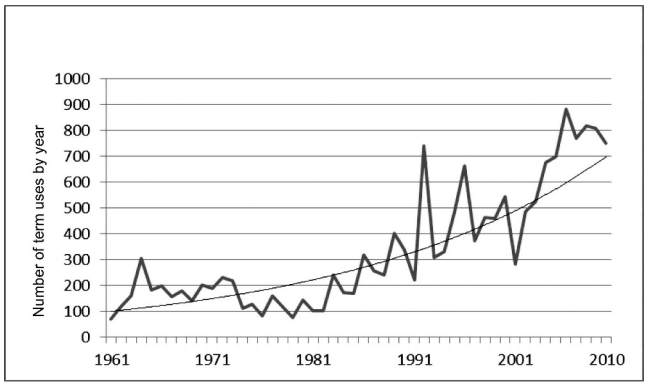
These results provide additional data showing the rise of research and evidence-based practice in the words used by authors in the *BMLA* and *JMLA.* The data also illustrate the usefulness of the Funk corpus for investigating a variety of trends in our profession in more depth. The Funk dataset is available as an online only supplement to Funk's 2012 Doe lecture in the *JMLA* [18].

3. MLA research activities

A report on MLA's research initiatives from 1999–2010 provided by MLA Executive Director Carla J. Funk, CAE, shows a lot of activity [19]. The initiatives include surveys undertaken by MLA headquarters on topics such as member salaries and competencies, benchmarking, membership, publishing, health information literacy, and consumer health information. In some instances, the research and data collection were undertaken by MLA headquarters in partnership with other organizations, such as the Pew Internet & American Life Project and the National Library of Medicine. Some research activities, such as the annual meeting evaluation, are conducted on a regular basis, while more comprehensive member surveys and *JMLA* readership surveys are periodic. MLA research activities reveal an approach that emphasizes both ongoing needs for continuous data collection in some areas and quick responses to topics of current interest, such as information specialists in context, social networking software, Magnet hospitals, personal health records, health literacy, and scholarly publishing, Chapters and sections of MLA are frequently involved in their own additional research and data collection efforts. The association has nine grants, scholarships, and awards that support research, including the Donald A. B. Lindberg Research Fellowship. Additional award opportunities are made available by sections and chapters.

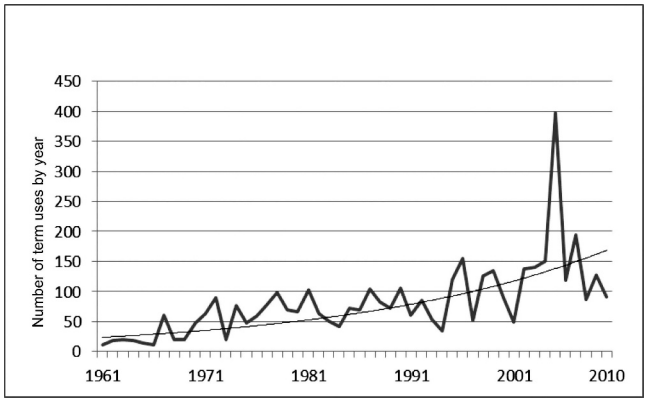
The MLA website features research prominently on its home page. From the Research tab, it is possible to get a good overview of research activities, including the association's peer-reviewed research journal, *JMLA.* The contents of the *JMLA* as well as MLA meetings have become more research oriented with the advent of structured abstracts, an emphasis on articles that contain empirical data, and inclusion

Figure 2
Research*



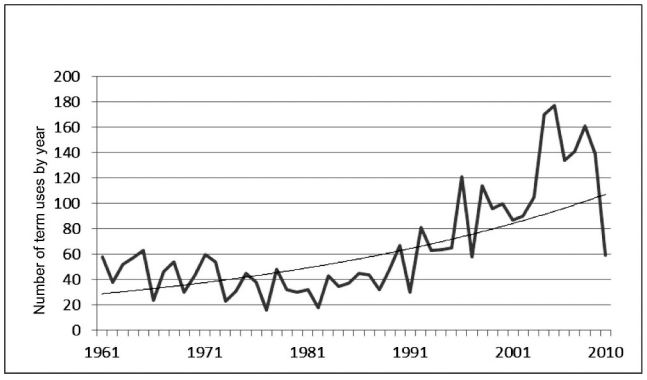
* Number of times the term "Research" or one of 88 variants appeared in a given year.

Figure 3
Evaluation*



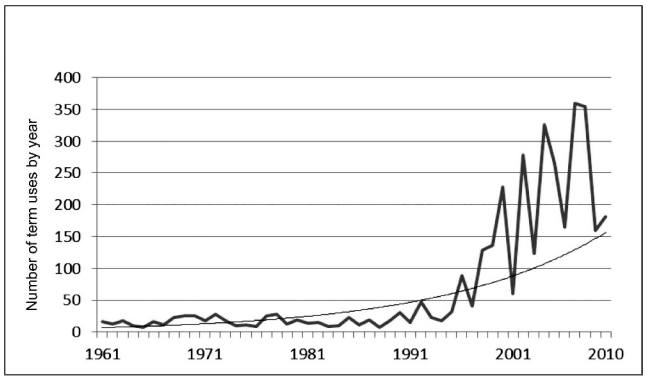
* Number of times the term "Evaluation" or one of 18 variants appeared in a given year.

Figure 4
Methods*



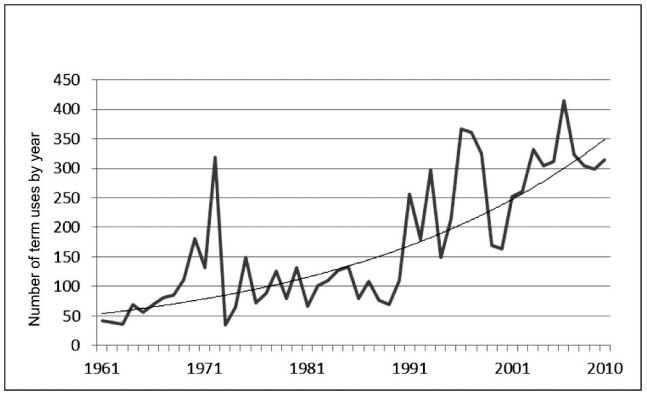
* Number of times the term "Methods" or one of 6 variants appeared in a given year.

Figure 5
Evidence*



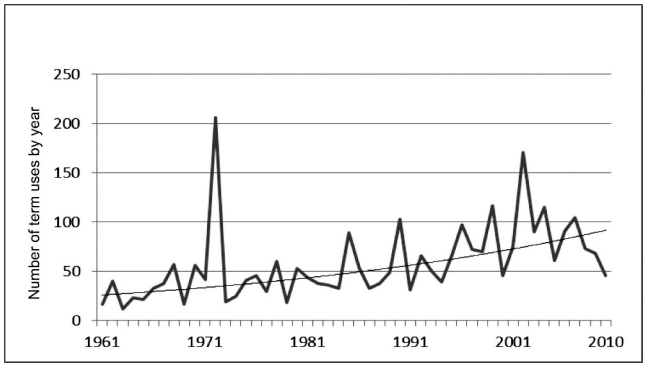
* Number of times the term "Evidence" or one of 19 variants appeared in a given year.

Figure 6
Survey*



* Number of times the term "Survey" or one of 32 variants appeared in a given year.

Figure 7
Measure(ment)*



* Number of times the term "Measure(ment)" or one of 13 variants appeared in a given year.

of supporting documents and data as online only appendixes. The Member Center of the website also includes the Center of Research and Education (CORE), which brings together a variety of resources for research, teaching, and learning. Of particular note are the activities of the MLA Research Section, which has published its own journal, called *Hypothesis,* since 1987. This open source journal is indexed in CINAHL and has three issues a year.

Another highly influential MLA document is the research policy statement. The original research policy issued in 1995 was entitled, ''Using Scientific Evidence to Inform Information Practice.'' The policy describes a variety of roles for the health sciences librarian, noting the broadening of the research roles of librarians beyond giving research support to library users to becoming more active users of library and information science research, doing their own research, and applying the results of research to practice. A second edition of the research policy statement, *The Research Imperative,* appeared in 2007. It enlarges upon the original document by using video vignettes to highlight topics such as creating a culture of research, improving our knowledgebase, and exploring our research domains and the required research skills. The document also includes a list of research milestones 1995 to 2007 that illustrates the progress that has been made.

The MLA educational policy statement, *Competencies for Lifelong Learning and Professional Success,* was also revised in 2007 and includes ''Research, analysis, and interpretation'' as one of seven ''Essential areas of knowledge'' that the health sciences librarian requires. These areas of knowledge have been incorporated into the MLA peer-reviewed professional development and career recognition program known as the Academy of Health Information Professionals. They are also used to indicate content areas in the MLA continuing education program.

4. Evidence-based library and information practice as an international movement

The fourth source of evidence for the rise of evidence-based practice in health sciences librarianship that I explored was at a global level. This seemed especially appropriate given the 2013 joint meeting with ICML and other international groups, and it provided an opportunity to explore the international aspect of the evidence-based practice movement since its beginnings. In 2012, Jonathan Eldredge, AHIP, noted that, ''Some of the most robust early EBLIP work originated in countries such as Australia, Canada, Sweden, the UK and the US'' [20]. I would add Denmark and the work of Birger Hjørland [21] and his colleagues to that list. Eldredge also noted emerging interest in Japan and Iran.

This global interest has been reinforced by the ''International Conference on Evidence-based Library and Information Practice'' that has been held every two years since 2001. Andrew Booth from the United Kingdom was instrumental in setting up the early conferences. Booth and his colleague Ann Brice also edited the first handbook on EBLIP in 2004 [22], which included a prehistory of the movement in chapter 3. Booth was a very articulate spokesperson for the fledgling EBLIP movement in the United Kingdom, leading a series of articles with Margaret Haines in the *Library Association Record* (UK) that began in 1998 [23], three years before the first conference. The seventh ''International Conference on Evidence-Based Library and Information Practice'' held in 2013 in Canada had an international advisory group representing fourteen different countries.

Another major development was the establishment of the open source journal, *Evidence-Based Library and Information Practice* <http://ejournals.library.ualberta.ca/index.php/EBLIP/>, at the University of Alberta in Canada in 2006. As noted on its website, the journal seeks to ''provide a forum for librarians and other information professionals to discover research that may contribute to decision making in professional practice.'' The authors from different countries who contribute to the journal and the editorial team, with members from eleven different countries, are evidence of the international reach of evidence-based practice in our field.

As part of my exploration for this lecture, I contacted colleagues from various countries who provided me with additional detail of their activities. I also contacted or explored the work of some of the international EBLIP pioneers such as Kathleen Ann McKibbon, FMLA, Liz Bayley, Denise Koufogiannakis, Lorie Kloda, AHIP, Virginia Wilson, Lindsay Glynn, and Jessie L. McGowan, AHIP, in Canada; Andrew Booth, Ann Brice, Margaret Haines, Christine Urquhart, Alison Brettle, Maria Grant, and others in the United Kingdom; Helen Partridge and others in Australia; Lotta Haglund, Malin Oglund, and David Herron in Sweden; and Yukiko Sakai, AHIP, in Japan. This exploration assured me that EBLIP was not only an ongoing international movement, but that it was also spreading beyond health sciences into other branches of the library and information profession.

WHERE ARE WE GOING?

Whereas traditional research has been generally been thought of as a series of steps to collect and analyze information that will increase our understanding of a topic, evidence-based practice in both medicine and librarianship has a more specific goal of improving the decision-making ability of practicing professionals. In 2012, Eldredge published a revised definition of EBLIP that combined elements from several earlier definitions. He stated that:

> EBLIP provides a sequential, structured process for integrating the best available evidence into making important decisions. The practitioner applies this decision making process by using the best available evidence while informed by a pragmatic perspective developed from working in the field, critical thinking skills, and an awareness of different research designs, which is further modulated by knowledge of the affected user population's values and preferences. [20]

This definition suggests a broadening of the meaning of evidence and increasing recognition of the importance of professional experience and practice setting in EBLIP. The steps in evidence-based librarianship have traditionally been similar to those in evidence-based medicine: formulating an answerable research question, searching for evidence in the research literature, critically appraising the evidence found, making a decision and applying it, and evaluating outcomes. The hierarchy of desirable research methods has also been similar to that found in evidence-based medicine.

As EBLIP has evolved, librarians have found that there are many differences between medicine and librarianship that make it difficult to apply the original evidence-based practice model. Our accumulated research knowledgebase and literature are far more limited than that of medicine, and the type of research questions that we ask as library and information professionals are usually very different from those of practicing physicians. As a result, the hierarchy of research methods from evidence-based medicine is not always a good fit. Despite these limitations, the sources of evidence examined for this lecture show a rise in research and evidence-based practice in the profession. How can this be explained? The answer to this question lies in the creativity that has been displayed by librarians themselves as they have adapted the evidence-based practice model to fit their own needs and circumstances.

In response to some of his dissatisfaction with the original model, Booth suggested a revised model of EBLIP in 2009 [24]. Booth reviewed some of the limitations of the original five-stage model of evidence-based practice, noting that much decision making in librarianship is done in groups, rather than by individuals. The restrictive view of what counts as evidence may also run counter to the needs and practices of librarians. There has also been limited recognition of the complexity of decision making in librarianship. Booth outlined a new series of steps based on articulating the problem in broader terms; assembling the evidence base from multiple sources, not just the published literature; assessing the evidence through group discussion; agreeing on actions; and adapting the implementation.

This ''five As'' model was explored more fully in a dissertation by Koufogiannakis on how academic librarians use information in decision making [25]. Koufogiannakis found that the librarians she studied did use evidence, but not in the way that was described in the traditional evidence-based practice model. Her results pointed to the need to include local sources of evidence that take into account the context and setting in which decisions are made. Koufogiannakis also found considerable use of evidence for influencing and convincing in group decision making situations.

These findings suggest that EBLIP is evolving and changing and that we are developing our own unique approach based on our own settings and circumstances. These new approaches provide a positive direction for the future as health sciences librarians continue to seek the most effective ways of providing quality information for improved health care by linking research to practice. In addition, there are exciting new examples of how research results are being linked to practice, such as the *JAMA* article on the value of libraries and librarians in health care by Sollenberger and Holloway [26].

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